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Section 17 State Water Plan - Cedar/Beaver Basin

Water Conservation/Education

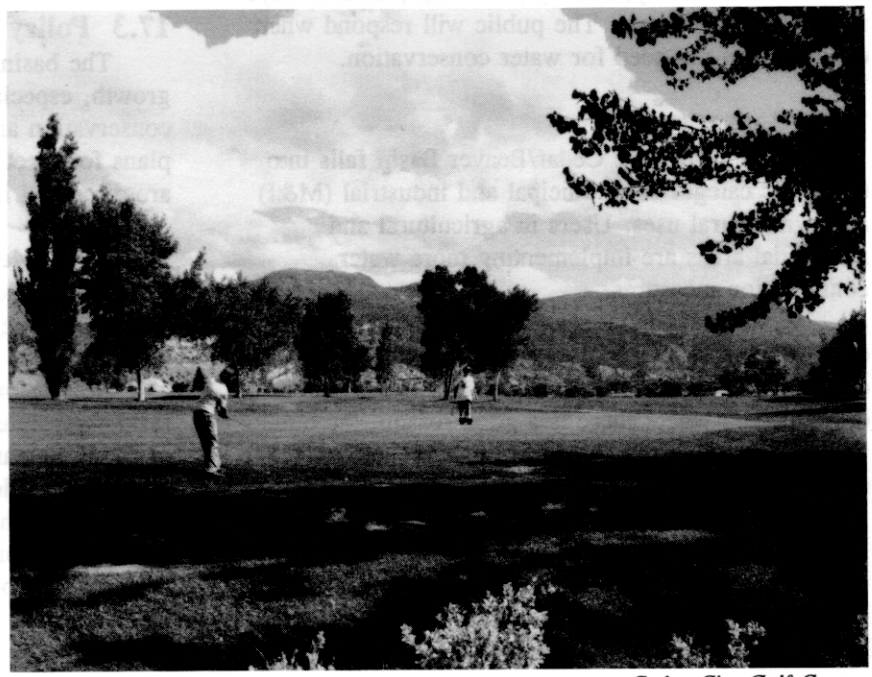
17.1 Introduction

During shortages caused by droughts, system failures or pollution episodes, a plan to conserve water can alleviate the impacts and stretch available supplies to meet priority demands. It is important to recognize that significant water use reductions can be achieved when people understand the reasons to conserve. The public has demonstrated a willingness to temporarily reduce water use during times of drought. By educating the public on the benefits of implementing long-term water conservation efforts, people will be more likely to accept conservation and will provide support and funding necessary to implement them. A well-managed water conservation program for all uses may postpone or eliminate the need for building new facilities and finding additional supplies.

The most effective conservation program combines measures incorporated into the design and operation of water supply systems, includes devices and practices employed by water users, and provides incentives to encourage people to save water. The first is accomplished as providers operate their systems more efficiently, the second as users make special efforts to reduce water use, and the third as water providers institute programs to discourage water waste.

To understand water conservation programs, there is a need to recognize the difference between depletions and diversions. Depletions consist of the water put to the desired end use and consumed and thus made unavailable for return to the system. Diversions must be sufficient to provide the depleted water supply along with any losses associated with delivery to the point of use. If a system were 100 percent efficient, diversions and depletions would be equal.

■ Conservation has been a way of life for many in Utah for generations. The state supports and promotes the conservation and wise use of water for all beneficial purposes.



Cedar City Golf Course

Some water conservation can be accomplished by decreasing depletions through changes in lifestyle, landscaping and economic activity. However, it is easier to conserve water by increasing the use efficiency and thereby decreasing the diversions.

Water quality also has to be considered in the water conservation process. All of the culinary water in the Cedar/Beaver Basin is supplied from springs or wells. This high quality water, suitable for culinary use, is more valuable to municipalities than lower quality supplies because of the treatment costs and social non-acceptance associated with odors and taste. In order to maintain an adequate reserve to meet growing demands and for use during temporary shortages, there should be a cushion between the existing supply of water and the anticipated needs. This can be accomplished by conserving existing supplies. In Cedar Valley, there is also another reason to maintain a reserve. Wells in the southwest part of the valley provide most of the culinary supplies. If the groundwater use exceeds the recharge, lower quality water may encroach into the well field and contaminate the higher quality supplies. Conservation can help reduce the pumpage and preserve this high quality water supply.

Generally, everyone supports water conservation. But nothing happens until someone takes the leadership for preparing and implementing a specific program. Over the long-term, education is the key to water conservation by making people more aware of the hydrologic cycle, including the limitations nature places on water availability, and by providing practical ways for more efficient use. The public will respond when convinced of the need for water conservation.

17.2 Background

Water use in the Cedar/Beaver Basin falls into two basic categories; municipal and industrial (M&I) and agricultural uses. Users in agricultural and residential areas are implementing more water conservation measures.

When water is inexpensive and plentiful, conservation is not popular, especially when additional costs are required for implementation. During times of drought, and where there is a good reason, the public will respond over the short-term to a request to conserve.

17.2.1 Municipal and Industrial Water

High quality water for M&I use is in short supply in some communities and is anticipated to constitute the largest share of future growth needs. Cities and towns are moving toward secondary systems to supply landscaping, gardens and industry with lesser quality water. The higher quality supplies are then reserved for culinary uses. While there are some secondary systems currently installed, several communities are investigating their feasibility for future development.

New light industry is moving into the basin. Included are a milk processing plant in northwest Cedar Valley, an explosive testing firm in the vicinity of the silver mine west of Beryl, and a prefabricated furniture plant near Cedar City.

17.2.2 Agricultural Water

A major agricultural geothermal water user is the greenhouse operation in New Castle. There is a large hog production operation under construction southwest of Milford and an ultra high temperature milk processing plant is locating near Cedar City. Crop production is the largest user of water in the basin.

Farmers have been installing sprinkler irrigation systems at an increasing rate over the last two decades. Some of the systems serve lawns and gardens as well as agricultural land such as the one in Paragonah.

Current irrigation practices allow room for improvement in distribution and application efficiencies. During preparation of the water budgets by the Division of Water Resources in 1994, estimates were made of conveyance and on-farm efficiencies. The water budgets indicate this is one of the most efficient areas in the state. The estimated efficiencies are shown in Table 17-1.

17.3 Policy Issues and Recommendations

The basin is experiencing considerable population growth, especially in the Cedar City area. This makes conservation an important component in the overall plans for meeting future water needs. Five policy issues are discussed in this section.

17.3.1 Residential Water Conservation Plans

Issue - Residential water conservation is needed to stretch existing supplies to help meet future growth demands.

Discussion - With an increasing population, residential water use is the fastest growing component of future demands. Developing additional sources of water for residential use is increasingly costly. Stretching high quality water sources by conservation to serve portions of future growth is and will be increasingly competitive with the cost of developing new supplies.

Table 17-1
IRRIGATION WATER USE EFFICIENCIES[22]

Water-Budget Area	Conveyance	On-farm (Percent)	Overall
Upper Beaver	85	55	47
Milford Area	85	55	47
Parowan Valley	95	65	62
Cedar Valley	85	55	47
Escalante Valley	93	63	59
Lower Beaver	85	55	47

As additional water sources are needed, residential water conservation is a valid measure to meet the growing M&I demand. Water suppliers need to identify conservation goals in relation to supplies and demands. Alternatives to provide water to meet projected demands should be identified. There is also a need to inventory present water supplies along with system capacities, demand projections and recommendations to meet future needs.

Recommendation - Water management and conservation plans should be developed by Beaver, Cedar City, Enoch, Milford and Minersville. Conservation measures should be among the alternatives investigated.

17.3.2 Secondary Water Systems

Issue - Secondary water systems can reduce the demand for high quality water.

Discussion - Supplies of high quality culinary water are limited. Treating lower quality surface water supplies is costly. For these reasons, municipal water providers may consider delivering low quality water for certain uses. A large portion of existing municipal supplies are used for landscape irrigation where there is no need for water meeting culinary standards.

To meet future demands, supplies presently used by agriculture can be converted to secondary uses and eliminate the need to find more distant sources of higher quality water. This will delay or, in the case of some slower growing communities, may eliminate the need for developing more municipal water for many years, thus reducing future financial outlays.

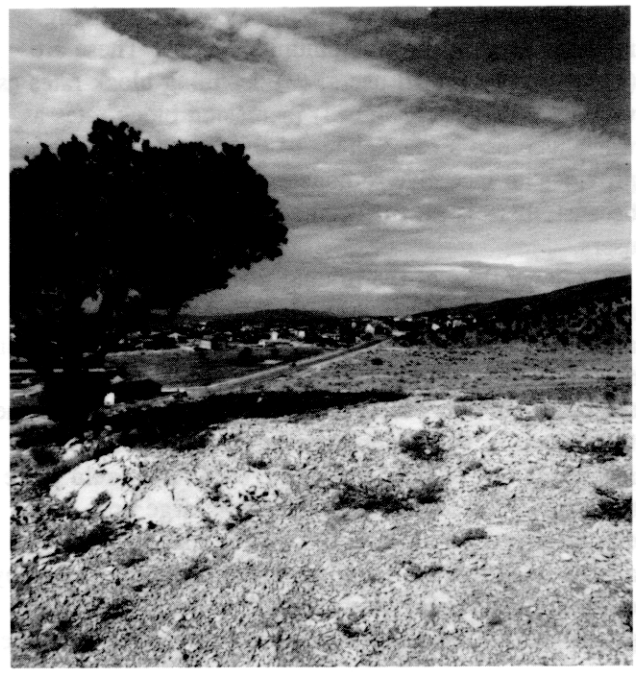
Recommendation - Cedar City, Enterprise and Minersville should undertake studies to determine the feasibility of constructing secondary water systems.

17.3.3 Xeriscape Landscaping

Issue - The use of water conserving landscapes can reduce the need for limited supplies.

Discussion - Landscapes use a major portion of the culinary water in most communities. Although extensive turf around homes has become the normal landscaping practice, this can be adjusted to conserve water and still maintain appealing, attractive landscapes.

Xeriscaping uses a combination of native plants, low water using exotic plants, mulched flower beds, hardscaping (decks, patios and rock gardens), and smaller and selective turf areas to achieve a pleasing mix. Correctly designed xeriscaping can also meet the needs for recreation and entertainment areas along with



Fiddler Canyon area in Cedar City

beautification. This can reduce water use up to 50 percent of that required for a typical monoculture of turf grass. A list of low water use plants applicable to the Cedar/Beaver Basin can be obtained from nurseries and landscape designers in the area. In addition, the Division of Water Resources has similar information available.

New residential construction lends itself best to xeriscape type landscapes. Installation is more expensive than costs for current landscaping, but it will achieve an aesthetic, functional design. Installation costs can be recaptured through more economical operation and maintenance outlays. Replacing existing landscaping can be very costly; however, it does provide an opportunity to redecorate the outside areas while conserving water. Feasibility will depend on the cost of water and individual desires. New subdivisions, such as those around Cedar City, would especially have good potential for xeriscape type landscapes. The Division of Water Resources, Utah Nurseryman's Association and home builders in the state are developing a brochure that will encourage new home owners to implement xeriscape-type landscapes.

Recommendation - Communities, particularly Cedar City and Enoch, should install model water conserving landscape demonstration projects on city property.

17.3.4 Water Pricing

Issue - Some water pricing rate structures can affect water use.

Discussion - There are three common pricing methods used in most communities today. These are (1) level rates for all users, (2) declining block rates as water use increases, and (3) increasing block rates as water use increases. Neither of the first two methods provides an incentive to conserve water, primarily because there is no financial saving to most of the users.

Regardless of the pricing method used, any reduction in water use through water conservation reduces revenues to the suppliers without a reduction in the fixed costs of the facilities. This puts a burden on the water supplier. Increasing the base rate to cover the fixed costs of system operation and implementing an increasing rate for use above the base rate would place the burden for additional supplies on large or extravagant users. Provisions can be made for low and/or fixed income families similar to systems used by other utilities. Using this method, as use increases, prices and the associated consumer cost would increase. This would provide an incentive for water conservation.

Recommendation- Water purveyors should establish base rates to cover fixed costs and set increasing block rates for use above the minimum.

17.3.5 Cropland Irrigation Efficiency

Issue - Irrigation efficiency improvement is an effective means of conserving water and maintaining quality.

Discussion - The technology for improvement of irrigation efficiencies is well-proven and accepted. Improvement of irrigation efficiencies can have an impact on the largest use of water in the basin. The biggest hurdle is the capital costs. Funding programs to aid irrigators defray these costs hold potential for increasing water conservation efforts. These funding programs are discussed in Section 8.

When irrigation conveyance and application efficiencies are improved, less water needs to be diverted to meet the same crop needs. This can reduce labor costs as well as deliver more water to the crop root zone where it is needed. This in turn reduces the percolation of water beyond the root zone and into the groundwater reservoir, thus reducing the leaching of salts and helping to maintain the quality of water in the groundwater reservoirs.

Recommendation - The Utah Department of Agriculture, Consolidated Farm Service Agency, Cooperative Extension Service, Natural Resources Conservation Service and Division of Water Resources need to continue providing technical and financial assistance to agricultural water users to make more efficient use of existing supplies.

17.4 Water Conservation Needs

Conservation of resources is always a good practice. Because of the limited water supplies, especially for culinary use in Cedar Valley, conservation can be the most economical and efficient way to meet a significant portion of the future demands.

The basin population is projected to increase from about 26,500 in 1990 to 56,600 in 2020, an increase of nearly 115 percent. If water diverted for culinary purposes increases at the same rate without applied conservation, an additional 9,170 acre-feet of water will be needed by the year 2020. The population of Cedar City is projected to increase from 13,443 in 1990 to 26,194 in 2020. This increase will require an additional 4,000 acre-feet of water annually. Water conservation can reduce this by over 2,000 acre-feet.

However, averages do not reflect the total picture. Some areas may have ample water, even in times of drought. Other areas may be short of water when drier than normal years come and could be in dire need during prolonged drought periods.

There is a need for additional agricultural water, primarily in late summer, in most of the basin. Installing conservation practices can help meet this need.

17.5 Water Conservation Alternatives

There are several methods and/or programs to conserve water.[14] These include well-designed and operated systems, installation of water saving devices and practices, and an incentive/penalty program to encourage conservation. Structural and nonstructural means can be used to accomplish water conservation.

The largest demand for additional supplies will come from municipal and industrial (M&I) water uses. This will also be the most costly whether it comes from groundwater or from surface water where treatment will be required. Effective conservation should be concentrated on reducing demand. For example, if M&I water diversions are reduced by 25 gallons per capita day in Cedar City, by the year 2020 there would be a saving of about 730 acre-feet annually.

Xeriscaping has the greatest potential for water saving, especially where new construction is involved. Other opportunities exist for reducing water use inside as well as outside the home in existing residential areas. These include installing flow restrictors for showers and faucets, toilet dams, and providing leak detection kits and lawn watering guides. Recent legislation now requires water saving fixtures in new construction or when old ones are replaced. Reducing outside water use can also benefit areas where homes are constructed on collapsible soils such as areas in Cedar City.

Agriculture provides the best opportunity volume-wise for conservation of water. Farmers have been installing sprinkler irrigation systems at an increasing rate over the years and finding them cost effective, especially where gravity pressure can be used. As an example, the gravity sprinkler system in Paragonah serves lawns and gardens as well as agricultural land. There is still room for improvement in the distribution and on-farm irrigation efficiencies. If it is possible to increase the overall irrigation efficiency by 5 percent, there is the potential to reduce irrigation water diversions by about 15,300 acre-feet annually. This would leave more water in surface storage reservoirs for late season use. It would also decrease pumping from groundwater thus reducing deep percolation and the accompanying chemical contamination.

The most effective way to establish a conservation program is under the direction of managers responsible for M&I water supply and distribution. Irrigation companies can reduce losses in distribution systems, but the most effective conservation can be accomplished by the individual farmers increasing their on-farm irrigation efficiencies. Any saved water can be filed on for use on other land through the state's appropriation process.

One of the best ways to implement long-term water conservation is through public education. This can result in public realization of the value of and result in more public support for conservation programs. This is critical both to the people of this area as well as to the wildlife and ecological systems. A big part of a public education program is just teaching how life works and how it depends on water. ■ ■